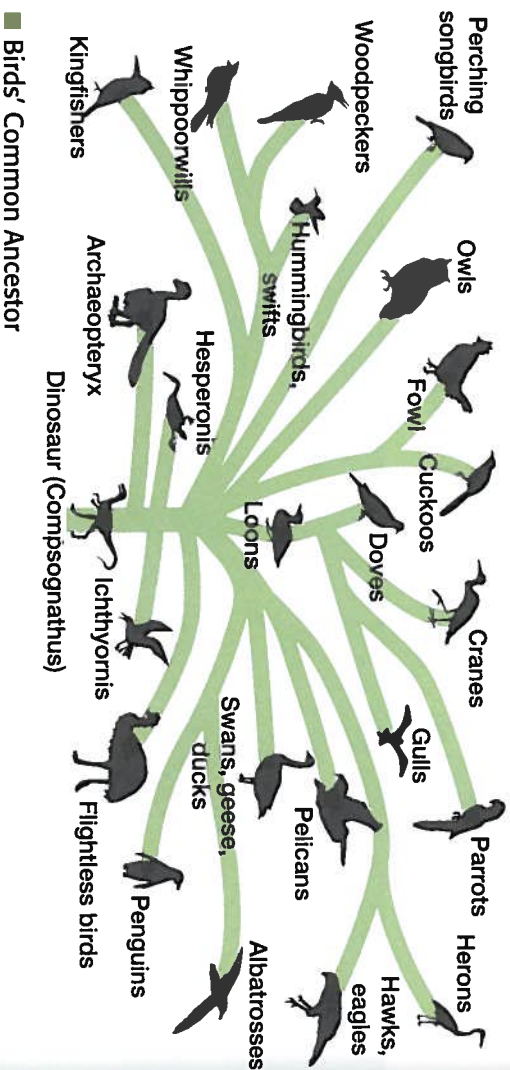


➤ For information on reproduction and genetics, see pages 66–73.

## The Theory of Evolution

CD 2  
TR 29

The theory of **evolution** explains how organisms change. Evolution means “change over time.” This theory states that new species develop from earlier species. Over time, new variations occur. The variations help species adapt in order to survive. Eventually, new species appear. For example, fossils show that about 200 million years ago, there were no birds on Earth. But there were dinosaurs. Later fossils show some dinosaurs evolving into birds. Fossil evidence supports the theory that birds’ common ancestor is a dinosaur.



### Science Skill Reading a Tree Diagram

This tree diagram shows how scientists believe birds evolved. The **base**, or bottom, of the tree names the common ancestor. The first bird species branch off near the base. These birds are **extinct**. They don’t exist today.

Look at all the tree branches. Find the birds at the ends of the branches. You can see how different types of birds are related.

1. What kind of bird is most closely related to hummingbirds? Explain.
2. Which four kinds of birds have the loon as a common ancestor? Explain.

### Academic Vocabulary

Variations	develop	occur	over time.	happen
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### Word Study

#### Multiple-Meaning Words

The word **theory** has an everyday meaning and a scientific meaning.

In everyday speech, a theory is an idea or guess. It is based on limited knowledge. It might or might not be true.

He can’t prove his **theory** that cats can think.

In science, a theory is an explanation of how things happen. A theory is based on careful observation and hypotheses that scientists have tested and retested many times with scientific methods.

Fossil evidence supports the **theory** that birds’ common ancestor is a dinosaur.

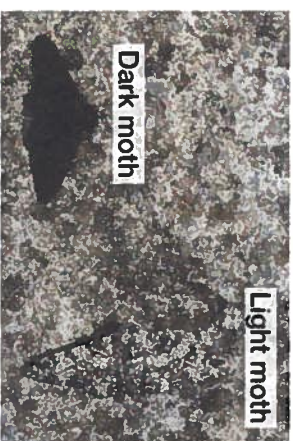
## Natural Selection

CD 2  
TR 30

Organisms have many variations. Over time, some variations help the organisms survive. Those organisms live and reproduce. The result is an adaptation. This process is called **natural selection**.

Natural selection explains how organisms that are best adapted to their conditions survive. Two kinds of moths are a good example. The picture shows two subspecies of moths on a tree trunk. The dark moths were easy to see on light tree trunks. Birds and other insects saw and ate the dark moths. These moths became less common.

In the 1800s, coal dust darkened the tree trunks. The dark moths were hard to see. Birds and other insects stopped eating the dark moths. Dark moths became more common. The larger numbers of dark moths was the result of natural selection.



Light and Dark Peppered Moths on a Light Tree Trunk

### Check Your Understanding

1. What is the theory of evolution?
  2. What animal is birds’ common ancestor?
  3. Why did dark moths become more common than light moths?
- Critical Thinking: Recognizing Evidence**
4. What evidence can scientists use to show that birds developed from dinosaurs?



Green Moss

**Research and Inquiry** Use the internet, the library, or your science book to answer these questions.

1. Who was Charles Darwin? What led him to think of the theory of evolution by natural selection?
2. What is the geologic time scale? What does it show about how species of organisms have changed over time?
3. How have bacteria changed because of antibiotics?

**Writing** Imagine that a moss starts growing on tree trunks. What kind of adaptation will help the moths? Write a paragraph.

➤ For more information on scientific methods, see pages 2–5.